Climate Change and New Zealand Agribusiness

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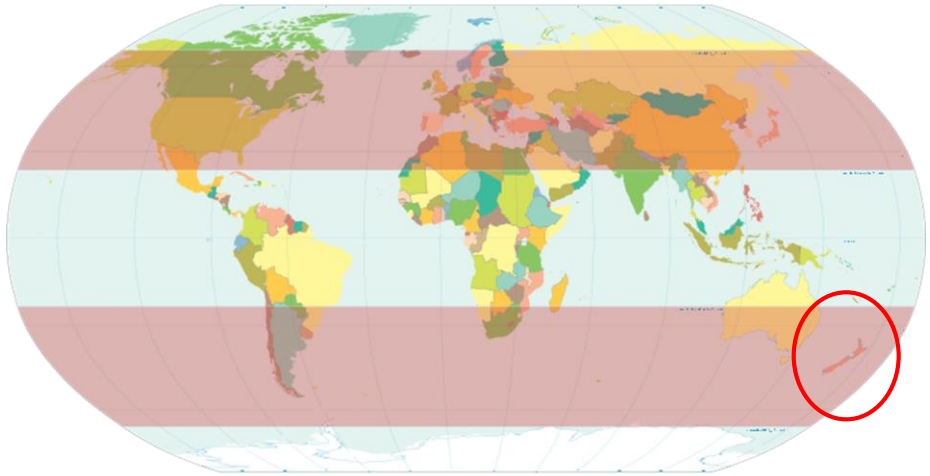
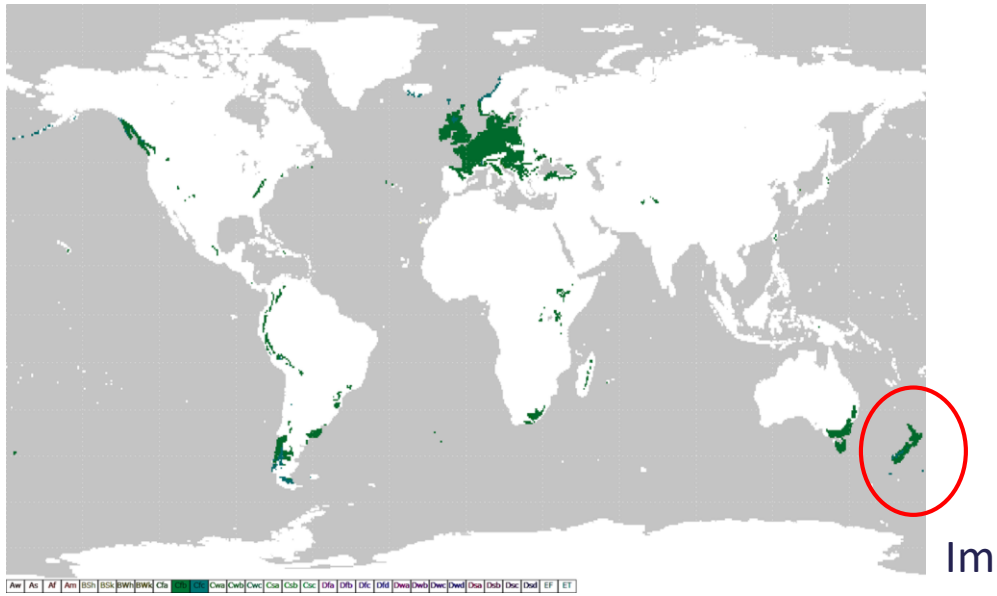
Outline

- Unique features of New Zealand agriculture
- New Zealand's emissions profile and commitments
- Challenges and potentials in reducing agricultural emissions in New Zealand (reduction)
- Challenges faced by New Zealand agribusiness in Climate Change (adaptation)

Unique features of New Zealand agriculture





- Temperate-maritime climate enables C3 grasses growing almost all year round – high dry matter output per year
- Small population (4.8 million) and high costs of infrastructure
- Dominated by pasture-based production systems
- High proportion of ruminant animals

Images: creative commons

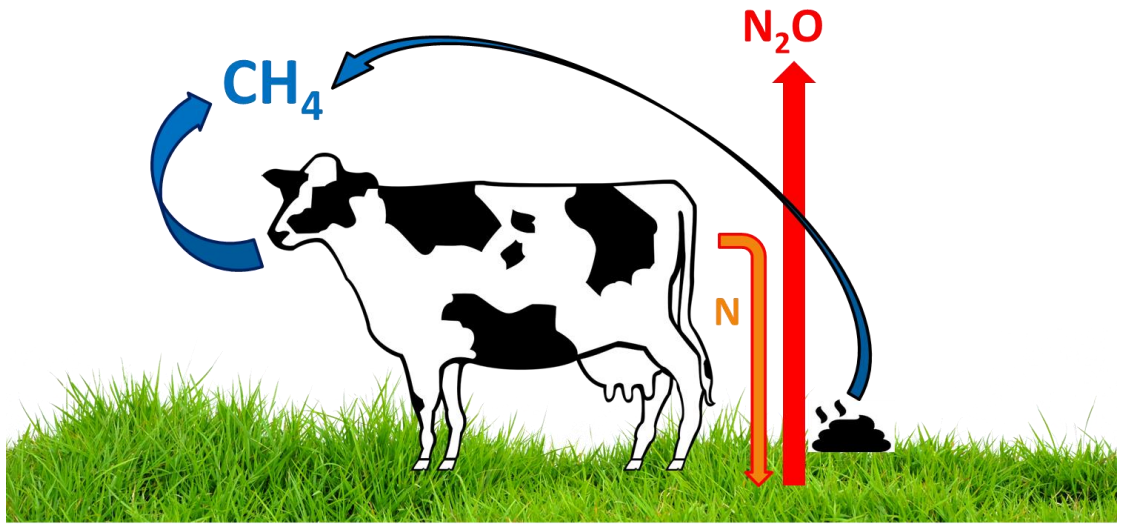
Where do livestock emissions come from?

Methane

- Enteric fermentation
- Stored and deposited animal wastes

Nitrous Oxide

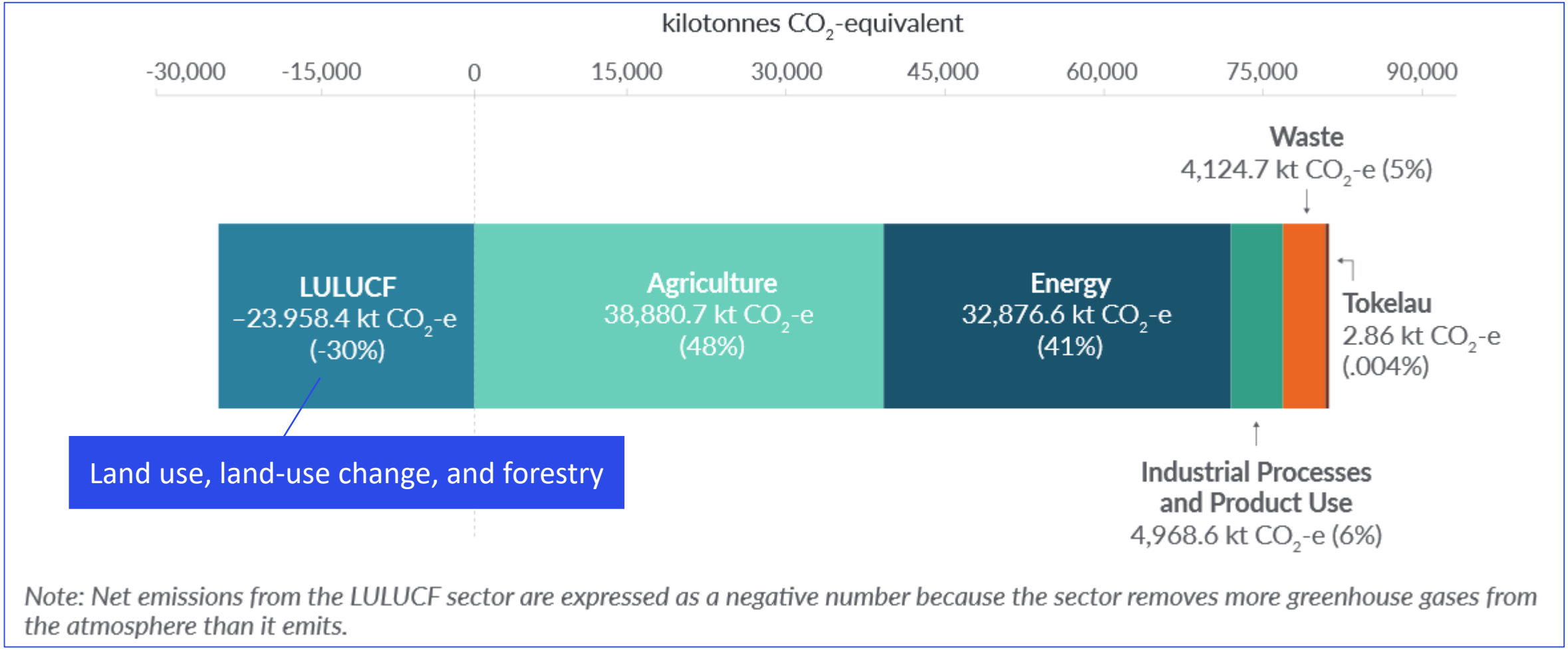
- Pasture deposited animal wastes
- Manure management
- N fertiliser



Ruminant	Kilotonnes CO_2 equivalent (2017)
Sheep	27,370,000
Beef	3,610,000
Dairy	6,470,000
Deer	850,000

New Zealand's emissions profile in 2017

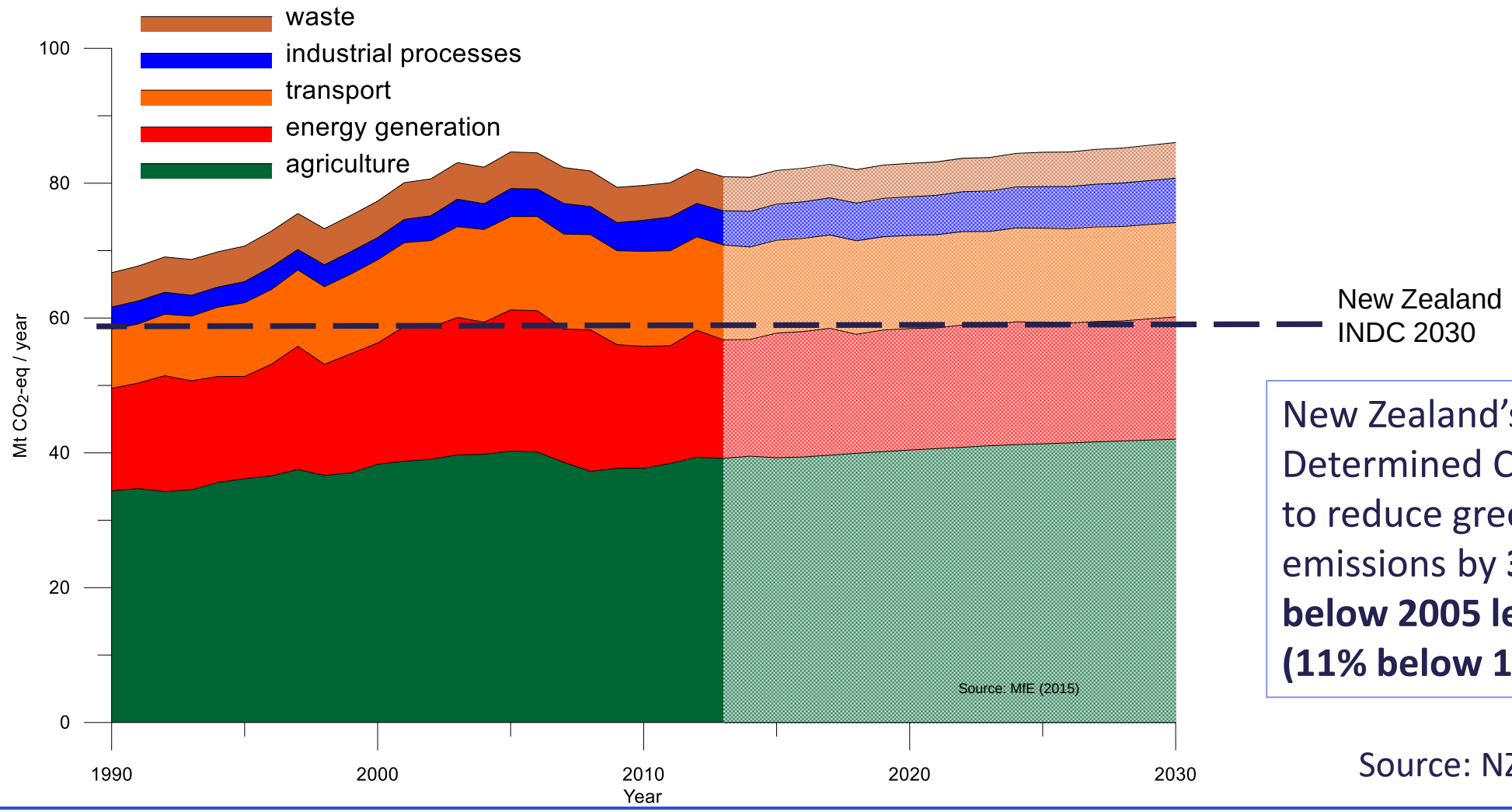
This graph shows how much each sector contributed to our greenhouse gas emissions



Note: Net emissions from the LULUCF sector are expressed as a negative number because the sector removes more greenhouse gases from the atmosphere than it emits.

https://www.mfe.govt.nz/sites/default/files/media/Climate%20Change/final_greenhouse_gas_inventory_snapshot.pdf

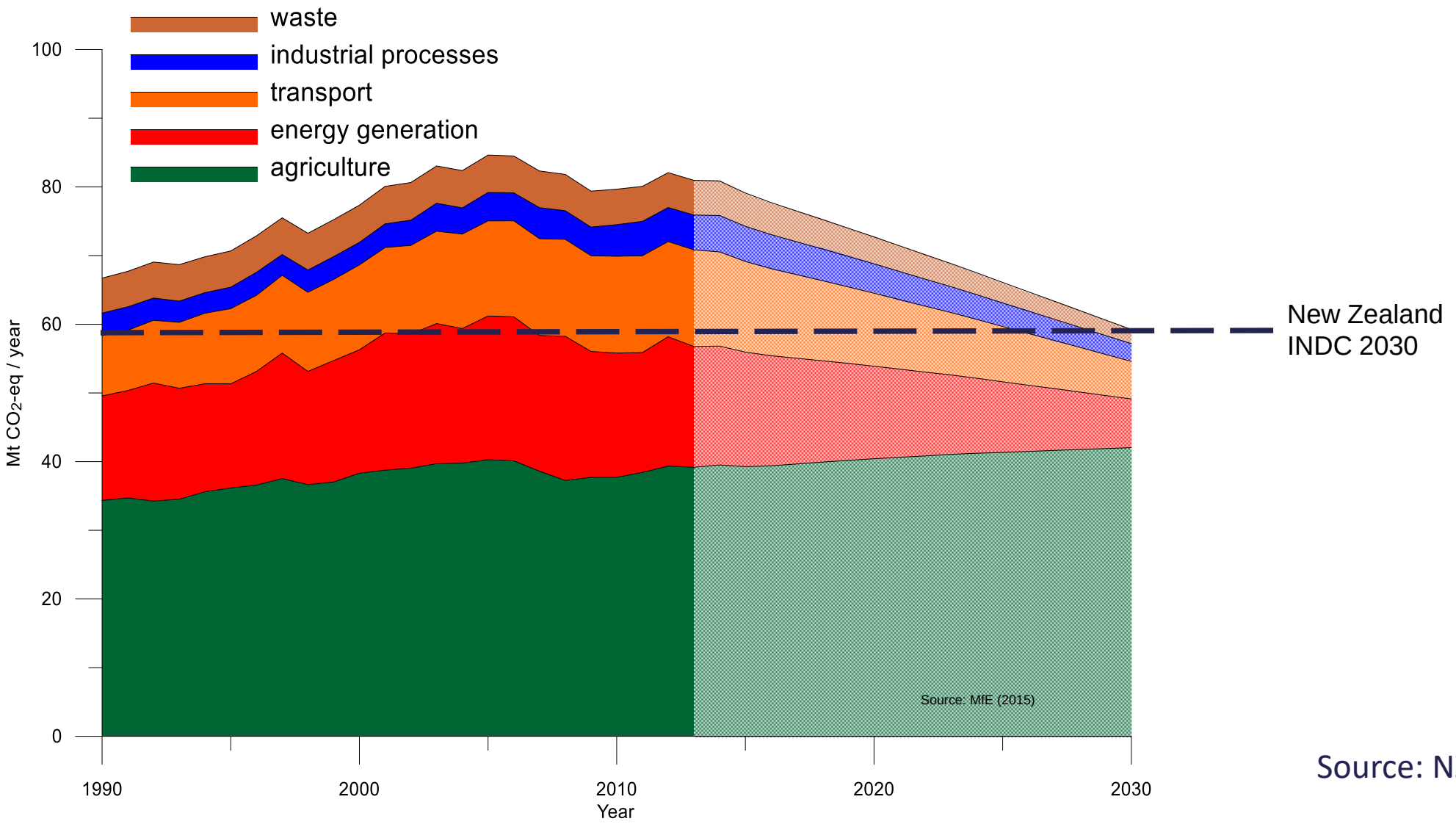
New Zealand emissions are expected to increase on the back of growing economy and global demand



New Zealand's Nationally Determined Commitments: to reduce greenhouse gas emissions by **30 per cent below 2005 levels by 2030 (11% below 1990 levels)**

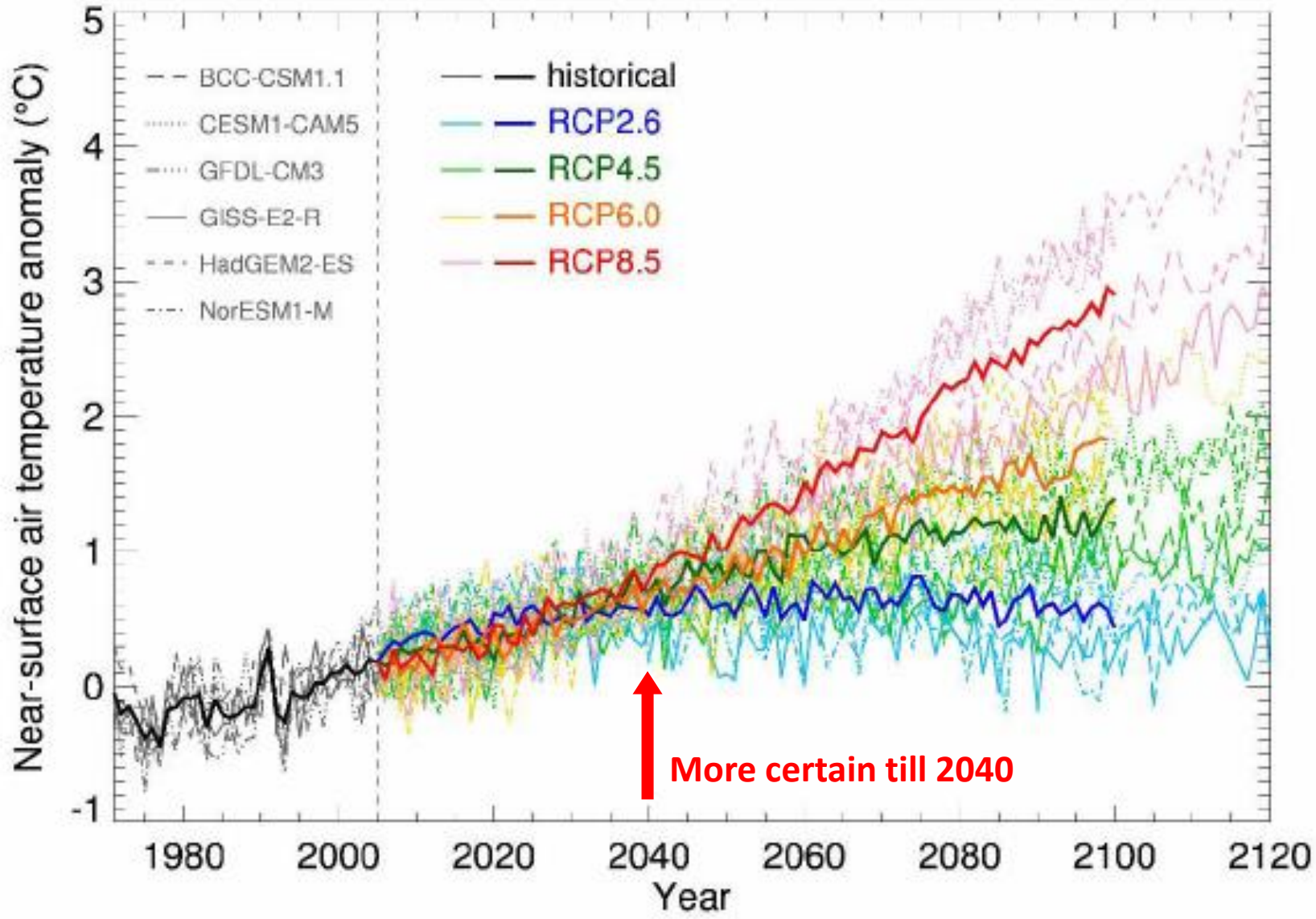
Source: NZAGGRC

If agriculture does not make a contribution….



Source: NZAGGRC

Projected NZ-average temperatures relative to 1986-2005



Uncertainty is unavoidable

- But decisions still need to be made
- ‘Robust’ under uncertainty:
  - flexible
  - reversible
  - win-wins
  - avoiding lock-in
  - soft rather than hard strategies

How can New Zealand reduce agricultural emissions?

Methane (CH_4)

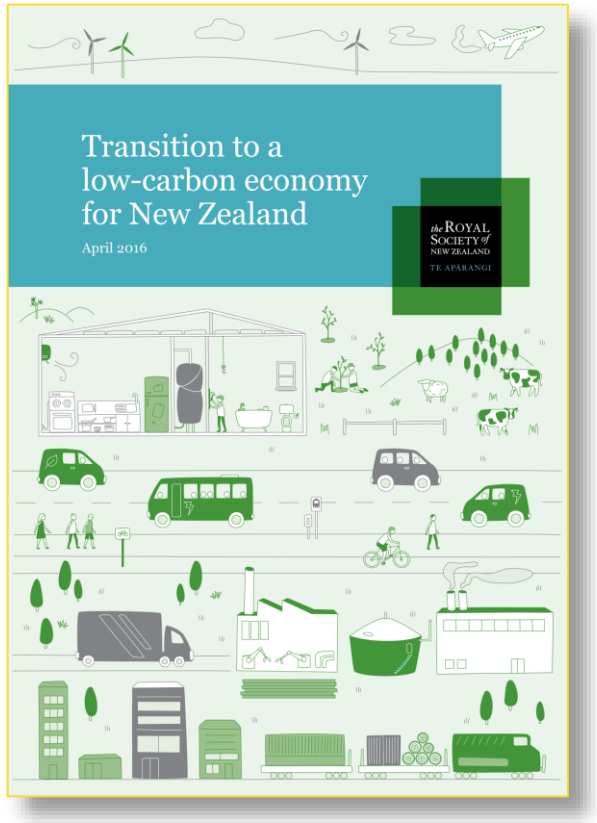
- Reduce animal numbers
- Methane vaccines
- Feed additives
- Forage/feed composition
- Efficiency

Nitrous Oxide (N_2O)

- Reduce amount of N excreted (eg. Through diet)
- Targeted and efficient N fertiliser application
- Increase N use efficiency (eg. Grazing management or N inhibitors)
- Avoid soil conditions that favour denitrification (eg. Improve drainage and avoid compaction)
- Many co-benefits

What can New Zealand agriculture do?

1) Further increases in animal productivity and farm efficiency & implementation of known technologies
2) Additional technologies that directly seek to reduce emissions
3) Constraints on the level and types of agricultural activity and movement towards low-emitting land uses



Manaaki Whenua
Landcare Research

From New Zealand Ministry of Primary Industries…

With widespread adoption of currently available mitigation options (mainly farm management practices) an **up to about 10% reduction** in absolute biological emissions from pasture-based livestock is possible.

A greater than 10% reduction in absolute biological emissions will likely require a **combination of on-farm mitigation and land-use change.**

https://www.mpi.govt.nz/dmsdocument/32125-berg-report-final-for-release-6-dec


Membership of the Biological Emissions Reference Group (BERG)

beef+lamb new zealand

Federated Farmers of New Zealand

Fonterra Dairy for life

DairyNZ

Deer Industry New Zealand

Horticulture New Zealand

Ministry for the Environment Manatū Mō Te Taiao

Fertiliser Association

Ministry for Primary Industries Manatū Ahu Matua

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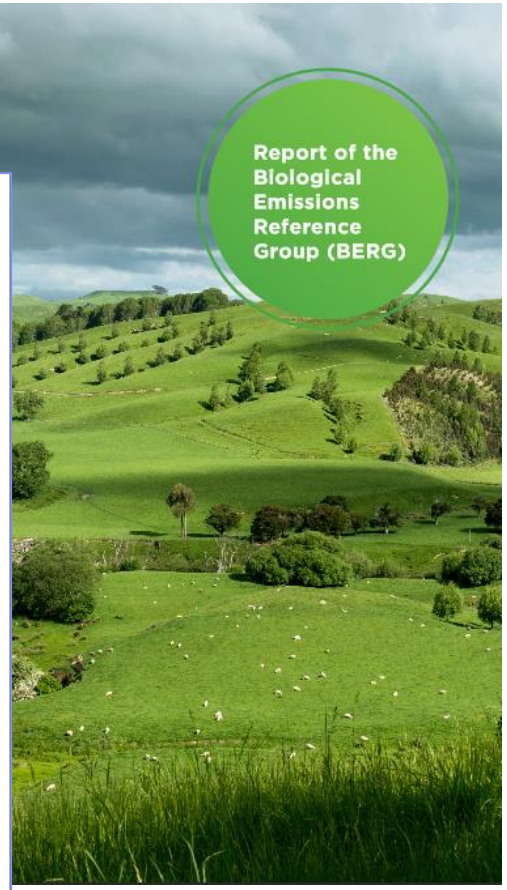
Disclaimer

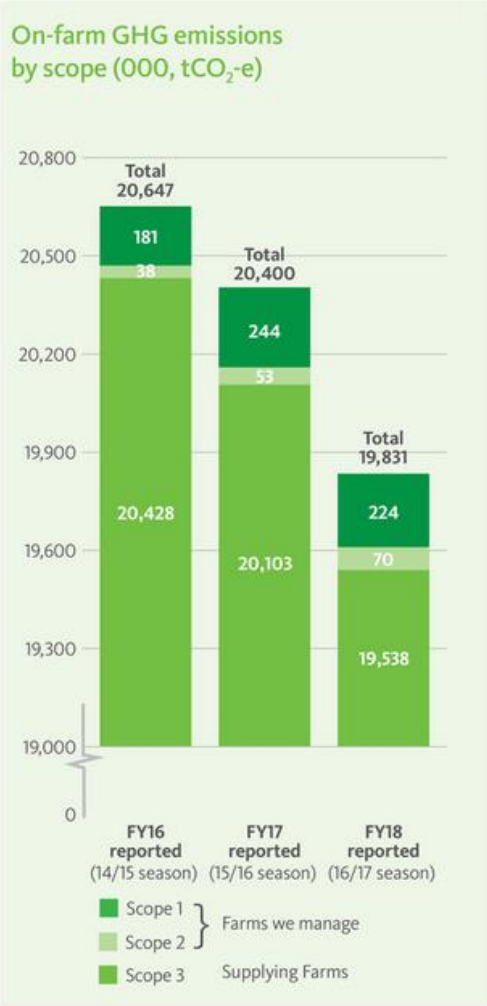
While every effort has been made to ensure the information is accurate, the Ministry for Primary Industries and other members of the Biological Emissions Reference Group do not accept any responsibility or liability for error of fact, omission, interpretation or opinion that may be present, nor for the consequences of any decisions based on this information.

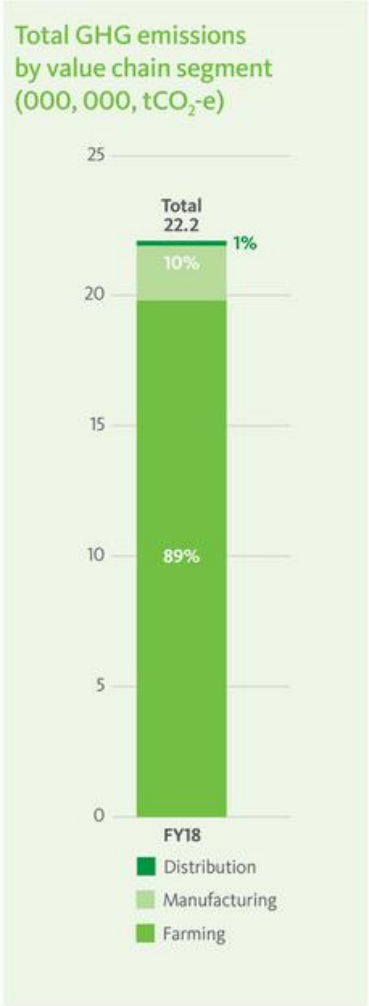


More than just on production

Fonterra pledges to stop building new coal boilers immediately

Gerard Hutching • 12:25, Jul 18 2019



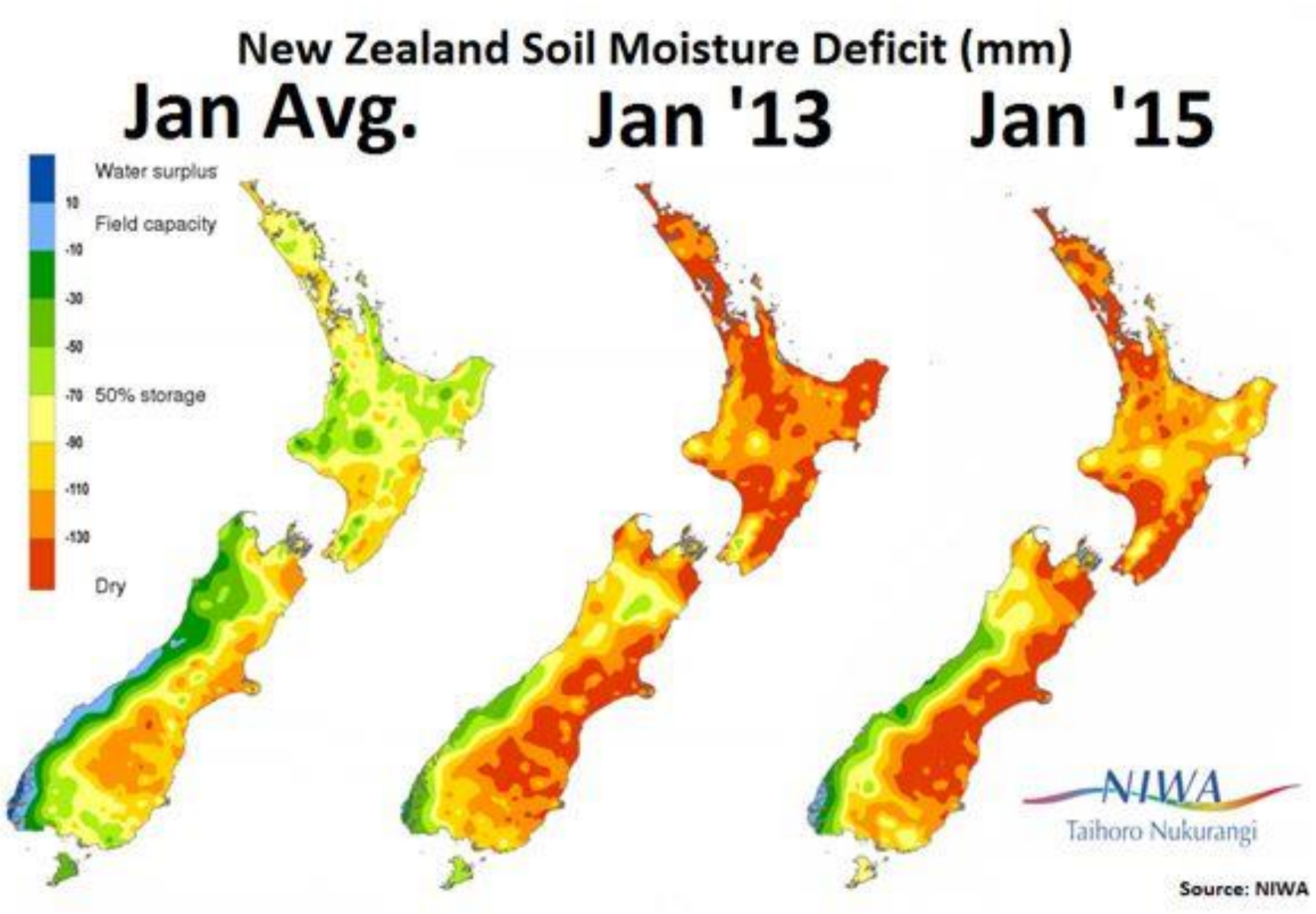


- Goal of net-zero emissions from manufacturing by 2050
- Committed to electrifying transport fleet

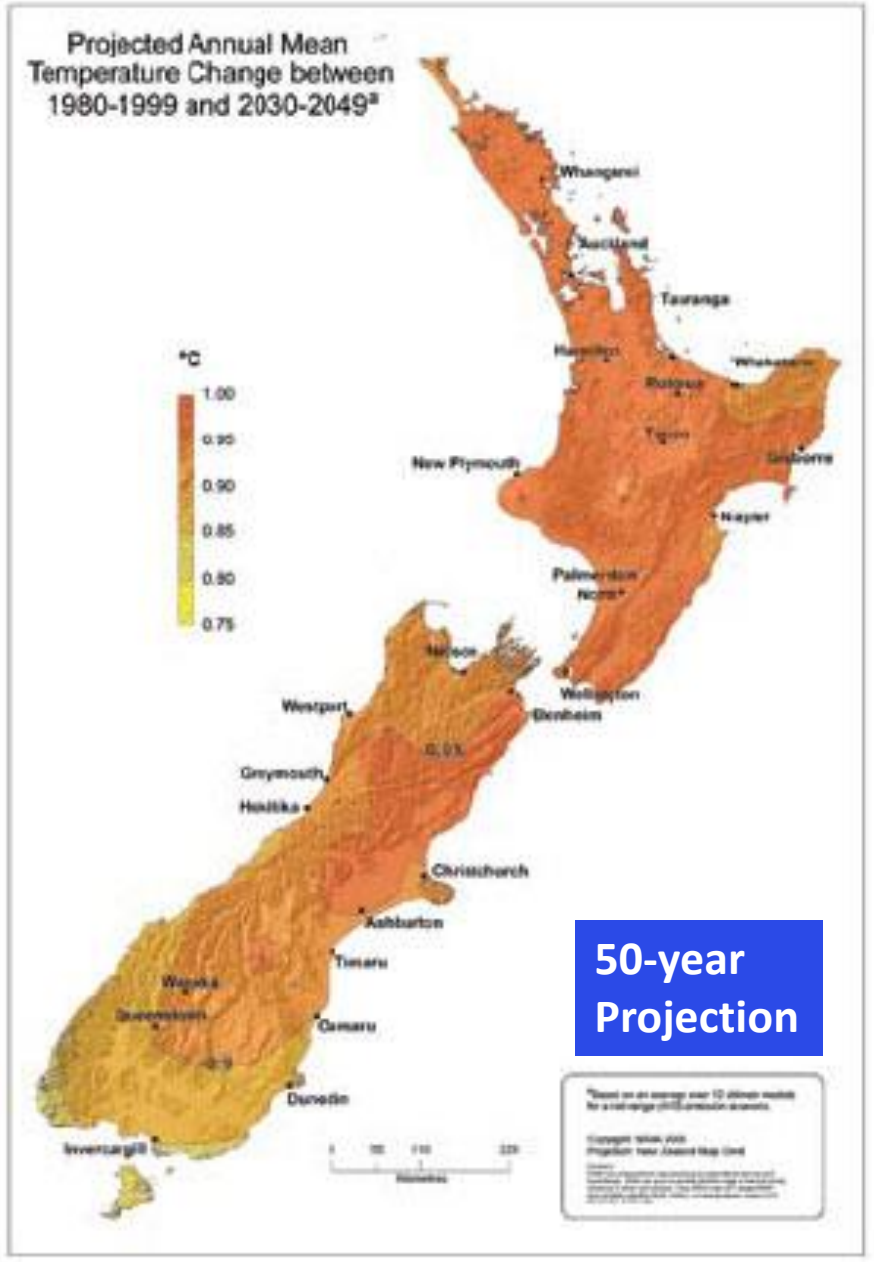
https://view.publitas.com/fonterra/sustainability-report-2018/page/62-63

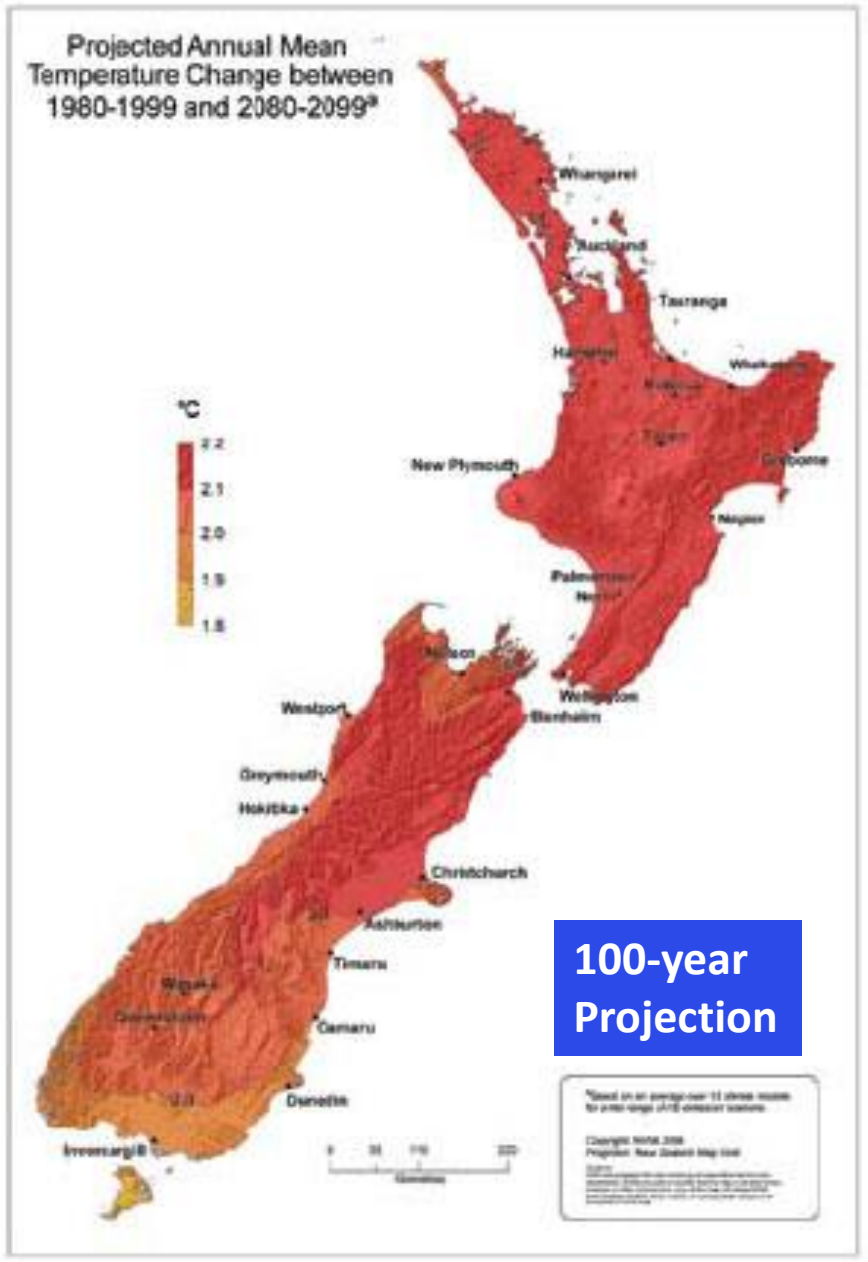
New Zealand agriculture needs to adapt to a changing climate

More Droughts



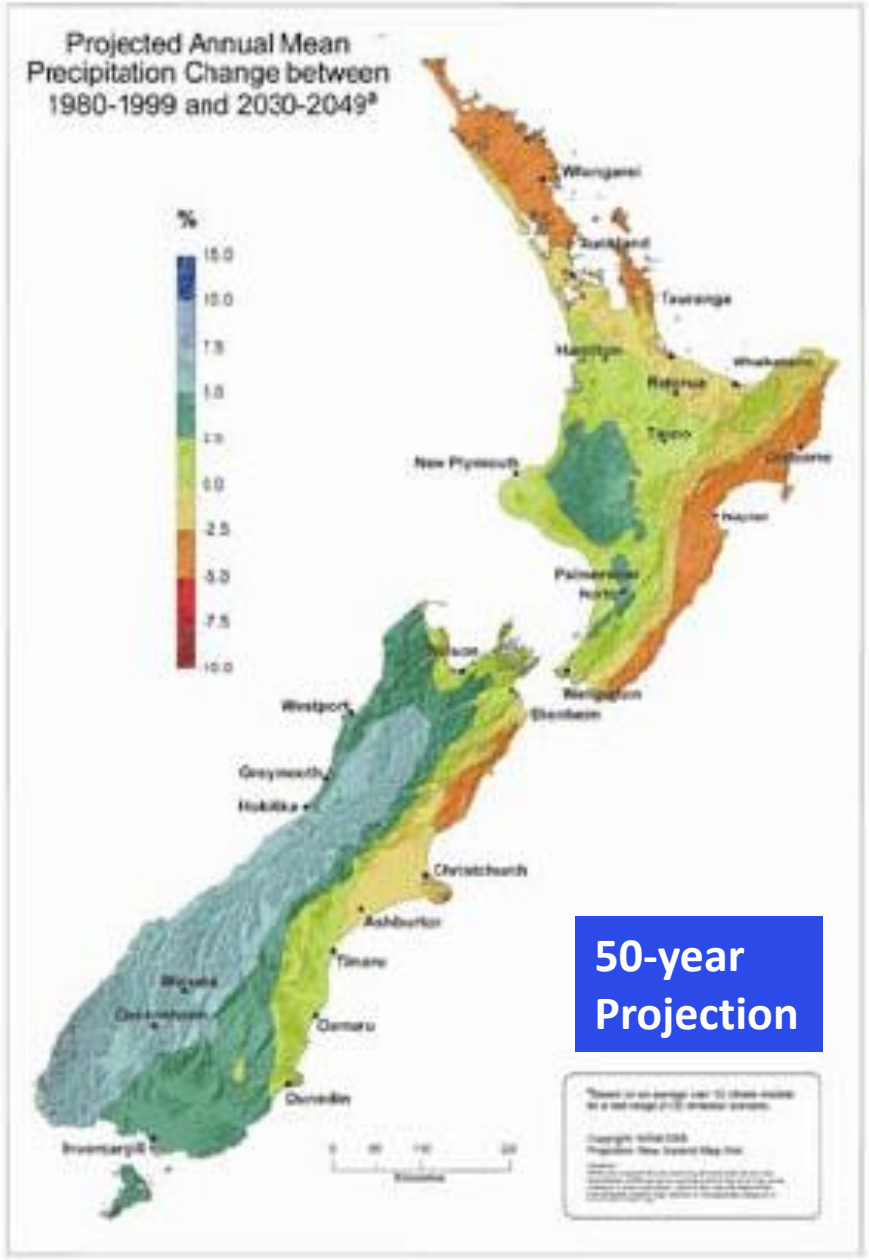
Temperature Rise

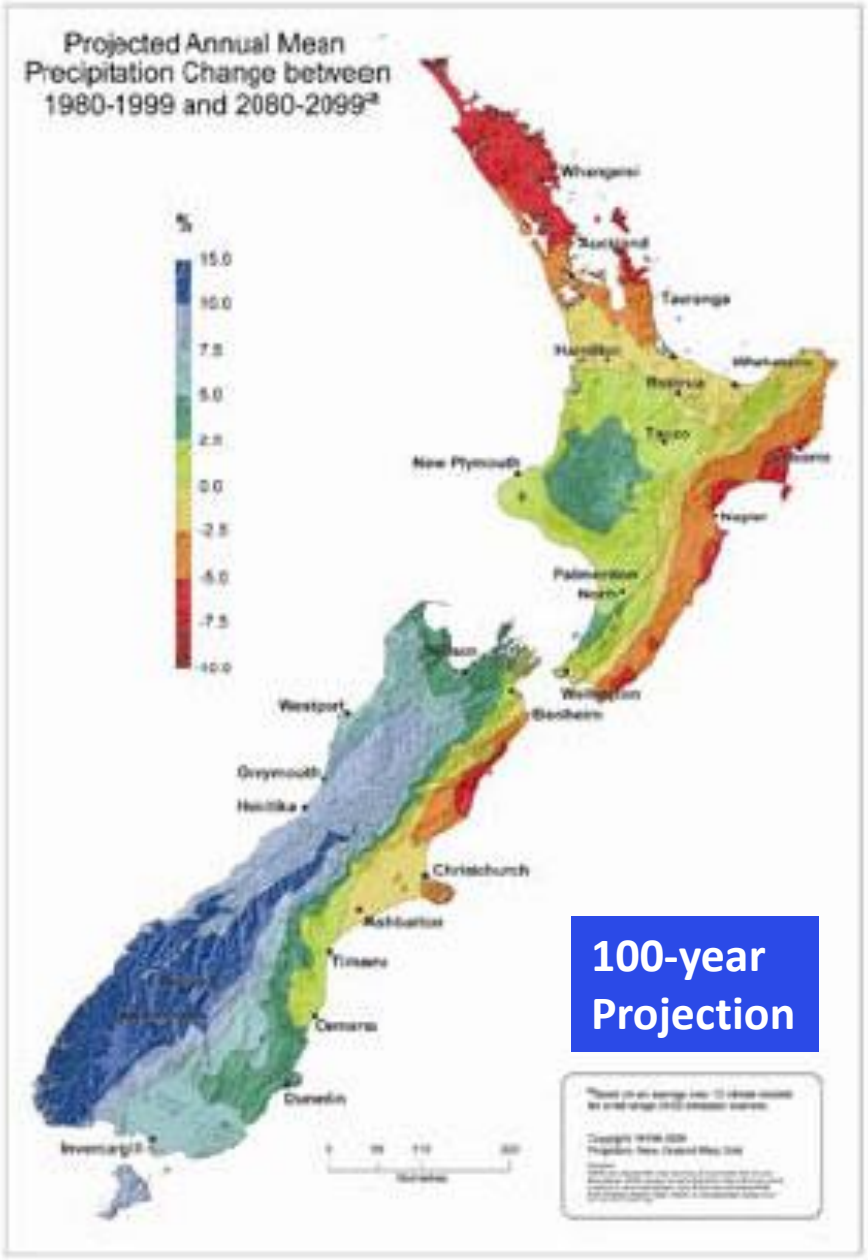




Source: mfe.govt.nz

More Extremes





Source: mfe.govt.nz

Projections of future climate change for Canterbury

- Higher temperatures (increase of 0.7 to 1 degree by 2040)
- Increased winter rainfall
- Decreased spring rainfall
- Increased frequency of heavy rainfall events
- Increased frequency and intensity of droughts
- Some increase in storm intensity, wind extremes and thunderstorms
- Increase in number of hot days
- Decrease in number of frost and snow days

Increased variability and extremes

www.mfe.govt.nz/sites/default/files/media/Climate%20Change/climate-projections-snapshot.pdf

Adaptation Required from New Zealand Agriculture

- Realising past is not a good guide for ‘future’ (30+ years)
- Need to improve resilience, because:
  - Change in seasons
  - Change in water availability
  - Lack of winter chilling
  - Change in pest, disease & weed distribution
  - Extreme heat, impacting on
    - animal welfare
    - transport
- Planned adaptations likely to be more cost-effective than reactive ones

Further resources

- New Zealand Agricultural GHG Research Centre www.nzagrc.org.nz

- Pastoral GHG Research Consortium https://www.pggrc.co.nz/

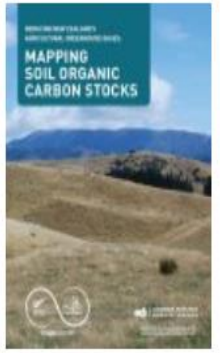
FACTS & FIGURES

Methane inhibitors

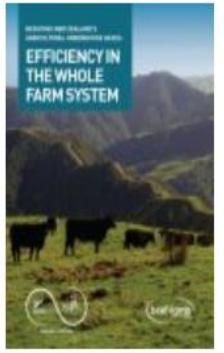
What we are doing (edition 2)

How we measure emissions (edition 2)

Agricultural GHG research funding in New Zealand



Mapping soil organic carbon stocks



Efficiency in the whole farm system

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